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## ADDITIONS TO THE JAPANESE LAND SNAIL FAUNA. III.

BY HENRY A. PILSBRY.

The Japanese fauna is proving very prolific in Clausilias, and may yet rival the richer portions of Eastern Europe in degree of specific differentiation. It is obvious that until much more merely descriptive work is done, no sound generalization upon the Japanese species is possible. I have therefore been satisfied to add to the accumulation of facts which can tell their story only when collections from many more localities come to our hands. Many of the species of *Clausilia* seem to be of restricted geographic distribution. Thus, the fauna of southern Hondo, Shikoku and Awaji seems to have but few Clausiliæ in common with the Nikko region.

The fruitful researches of Mr. Y. Hirase now enable me to add several species to the fauna of Shikoku Island, and a remarkable *Euphædusa* to the Hokkaido fauna, the first *Clausilia* known from that island. Moreover, he has discovered a very remarkable modification of the Euphædusan type, *C. mikado,* in the region of Lake Biwa.

In a former paper I described two species, *C. Hirasei* and *C. hyperoptyx,* remarkable among Asiatic Clausiliæ for their complicated internal armature. It is now proposed to erect a section for the reception of these species.

### Section ZAPTYX nov.

Clausilium tongue-shaped, about twice as long as wide, with subparallel lateral margins, the apex much thickened on the columellar side; posteriorly emarginate or auriculate on both sides of the filament or on the columellar side only; straight distally, but abruptly and strongly curved near the filament.

Shell small, the superior lamella widely separated from the spiral lamella; a fulcrum and parallel lamella developed; sutural plicæ present; upper palatal plica independent from or united with the well-developed lunella; no lower palatal plica.

Type *C. Hirasei* Pils.

Distribution: Southern Kiusiu and the Loo Choo Islands.

The general shape of the clausilium is somewhat Hemiphædusoid, but the abruptly bent and emarginate posterior end and heavily thickened apex differ strikingly from those parts in the clausilium of Hemiphædusa.

In *C. Hirasei* the clausilium (Pl. XXV, figs. 33, 34) is biemarginate behind. In *C. hyperoptyx* the columellar side only is distinctly emarginate.

### Section EUPHÆDUSA Bttg.

### (*Group of C. shanghaiensis.*)

**Clausilia comes** n. sp. Pl. XXIV, figs. 1, 2, 3.

Shell small, rimate, slenderly fusiform, rather weakly striate, the last whorl with delicate rib-striæ; olivaceous brownish. Apex slightly obtuse. Whorls 9, strongly convex, separated by deep sutures. Aperture not oblique, pyriform, with a distinct sinulus above, the peristome white, expanded and subreflexed, scarcely thickened. Superior lamella rather small, though rather higher than in *C. digonoptyx,* diconnected from or barely continuous with the spiral lamella. Inferior lamella converging strongly toward the superior, though somewhat less so than in *C. digonoptyx,* strongly spiral within. Subcolumellar lamella immersed very deeply. Principal plica short and small, wholly lateral. Lunella shaped as in *C. aculus,* but so slight as to be all but imperceptible except at the ends, which appear as small, short, irregular, upper and lower palatal folds. Clausilium of the typical form for *Euphœdusa,* short and wide, broadest distally, strongly curved, moderately thickened at the apex, the columellar side emarginate behind (Pl. XXV, figs. 35, 36).

Alt. 10, diam. 2.3 mm.

Kashima, Harima (Mr. Y. Hirase).

Belonging to the little group of *C. aculus, digonoptyx* and *tau,* this form is smaller and deficient in palatal armature. *C. aculus,* which probably does not occur in Japan north or east of Kiusiu, has a less developed superior lamella. In *C. digonoptyx* the lamellæ converge more, the lunella is better developed, and the striation is stronger. *C. tau* is a widely distributed species with long upper palatal plica and stronger lunella, etc.

**Clausilia monelasmus** n. sp. Pl. XXIV, figs. 4, 5, 6.

Shell rimate, slender, fusiform, strongly striate, brown. Apex rather acute, but the nuclear whorl is somewhat swollen; spire attenuated above. Whorls 8½ to 9, quite convex, the sutures well impressed, the last whorl narrower than the penultimate. Aperture hardly oblique, pyriform, with rather indistinctly defined, retracted sinulus. Peristome thickened, expanded, continuous, white. *Superior lamella wanting,* represented by a slight thickening of the peristome at its position; spiral lamella arising so far within that it is not visible from the aperture, but becoming high and continued to the ventral side, being longer within than the other lamellæ. Inferior lamella obsolete below, not emerging, but high within, as in *C. digonoptyx.* Subcolumellar lamella deeply immersed. Principal plica very short and small, lateral. Upper palatal plica strong, its lower end bent downward; lunella wanting; lower palatal plica short, well developed. Clausilium (Pl. XXV, figs. 26, 27, 28, 29) short and broad, strongly curved, not emarginate behind, and only slightly thickened apically.

Alt. 10.5, diam. 2.3 mm.

Kayabe, Ojima (Mr. Y. Hirase).

This is the first *Clausilia* to be made known from Hokkaido (Yesso), to my knowledge. It occurred with a small *Hemiphædusa.* It is remarkable for the obsolete condition of the superior lamella, the deeply immersed spiral lamella and the wide interruption of the lunella, the remaining ends of which appear merely as upper and lower palatal folds. A white line may be seen on the parietal wall, on looking into the aperture, caused by the subcolumellar lamella showing through.

(*Group of C. jos.*)

**Clausilia iotaptyx** n. sp. Pl. XXV, figs. 7, 8, 9.

Shell rimate, turrited, the penultimate whorl widest, those above nearly regularly tapering, then becoming almost cylindrical, the apex obtuse; rather solid, finely striate, a little more coarsely so on the back of the last whorl. Whorls nearly 11, but slightly convex, the last compressed. Aperture hardly oblique, ovate-pyriform, the peristome well expanded, slightly thickened, whitish, a little emarginate above. Sinulus high. Superior lamella rather small, oblique, contiguous to the spiral lamella. Inferior lamella deeply placed, but continued and emerging upon the peristome, straightened within and giving off a branch toward the spiral lamella. Subcolumellar lamella emerging, and with the inferior lamella, continued to the margin. Principal plica strong and long, nearly reaching the lip, and extending inward well beyond the lateral lunella. Palatal plicæ two, short, the upper parallel with the principal plica, the lower one oblique, a straight lunella connecting them, inserted near the middle of each, and with the plicæ forming an I-like figure. Clausilium (Pl. XXV, fig. 40), trapezoidal-oblong, not much curved, somewhat thickened at the sides, and especially thick on the columellar side near the apex, strongly emarginate posteriorly on the columellar side. It is shaped very much like that of *C. mikado.*

Alt. 18, diam. 3.8, longest axis of aperture 3.6 mm.

Alt. 16.3, diam. 3.3 mm.

Ibuki, Omi (Mr. Y. Hirase).

A solid, opaque species, with peculiarly thick though attenuated spire. The clausilium seems far too thick at the end for a *Hemiphædusa,* though it is more elongate than usual in *Euphædusa,* being a good deal like that of *C. mikado;* and as in that species the superior and inferior lamellæ are very widely separated, even within. Viewed from the back, in a specimen broken open, the inferior lamella is but very weakly spiral, much as in many Hemiphædusas, and is thickened below. The spiral and subcolumellar lamellæ both enter very deeply and equally, while in *Euphædusa* the spiral lamella should extend inward beyond the other, according to Dr. Boettger, confirmed by the species I have examined. This point is not very reliable perhaps, for in two specimens of *C. mikado* opened, one has the spiral lamella distinctly longer, the other has the inferior a little longer. I fear, therefore, that the sectional position of this species must be left in uncertainty. I place it in Boettger's *Formenkreis von C. jos,* of *Euphædusa,* but probably it belongs elsewhere.

Compared with the *Hemiphædusa* species, *C. iotaptyx* is nearest to *C. aurantiaca;* but the closing apparatus is lateral, the superior lamella is very low inside (while in *C. aurantiaca* it is high), and the spire is thick and clumsy above. The lunella and associated palatal plicæ are much as in *C. aurantiaca,* but the clausilium denies *C. iotaptyx* entrance in any group of *Hemiphœdusa.*

### Section TYRANNOPHÆDUSA *nov.*

Many-whorled, with distinct sinulus, deeply placed inferior lamella, very remote throughout from the superior lamella, the clausilium narrower than in *Euphœdusa,* tapering and oblique at the much-thickened apex. Other characters as in the *C. jos* group of *Euphœdusa.* I propose this section for the following remarkable species:

**Clausilia mikado** n. sp. Pl. XXIV, figs. 10, 11, 12.

Shell rimate, the lower half swollen, *upper half exceedingly attenuated;* livid gray, becoming dull red where worn, and overgrown with alga in most specimens seen.

Sculptured with crowded, very fine striæ, on the last two whorls becoming very much coarser, last whorl rather irregularly rib-striate. Apex obtuse and globose; *whorls 18,* the earlier 8 or 10 not increasing in diameter, even decreasing a little; the next few whorls gradually, slowly increasing, the last 4 whorls forming the rather swollen lower half of the shell's length; last whorl decidedly higher than the preceding, tapering, compressed at the sides. Sutures impressed. Aperture small, oblique, retracted above and below, irregularly pyriform, the sinulus strongly developed, high and narrow; peristome white, expanded and thickened, continuous, emarginate above, where it is built out far beyond the whorl. Superior lamella marginal, vertical, well developed, continuous with the spiral lamella. Inferior lamella not visible in a front view, deeply immersed, continuing very distant from the superior lamella within, but giving off a low branch toward it. Subcolumellar lamella emerging, sometimes continued to the margin of the peristome, and more or less distinctly bounded by grooves. Principal plica strong and long, extending nearly to the lip, and inward to the ventral side of the whorl. Upper and lower palatal plicæ short, oblique and parallel, connected by a nearly straight, narrow, rather weak lunella, which, however, is hardly connected with the upper palatal, and is lateral in position. Clausilium (Pl. XXV, figs. 37, 38, 39) strongly thickened at the sides and end, and especially along the columellar margin near the apex (fig. 38), abruptly emarginate on the columellar side posteriorly, the apex oblique, angular at the outer-lower or palato-apical extremity, rounded at the inner-lower or columellar-apical part.

Alt. 23, diam. 3.5, longest axis of aperture 3.5 mm.

Ibuki, Omi (Mr. Y. Hirase).

Remarkable for its many-whorled, slender spire, solute aperture and peculiar clausilium. This species is the first one of its kind to be made known, and is one of the most remarkable of Mr. Hirase's discoveries.

### Section STEREOPHÆDUSA Bttg.

**Clausilia oostoma** Mölldff.

*C. oostoma* Mölldff., Journ. Asiat. Soc. Beng., LI, pt. 2, p. 4, Pl. 1, fig. 2 (1882).

*C. japonica* var. *surugæ* Pils., Proc. Acad. Nat. Sci. Phila., 1900, p. 447, Pl. 14, fig. 4.

In my former paper on Japanese Clausilias I did not recognize this species in my *C. japonica* var. *surugæ*. I am now satisfied that my variety is identical with the form defined by von Moellendorff.

**Clausilia brevior** var. **addisoni** nov.

Larger than *C. brevior*, alt. 16–18½, diam. 4½ mm., more coarsely striated, especially on the last whorl; three palatal plicæ only. This form I at first considered to be the var. *tetraptyx* Mlldff., having received but one specimen from Mr. Hirase. A large series in the collection of Mr. Addison Gulick shows it to be distinct. It is viviparous.

Kagashima, Satsuma, in southern Kiusiu (Gulick coll.).

**Clausilia hondana** n. sp. Pl. XXIV, figs. 13-18.

Shell rimate, fusiform, dark brown, sculptured with fine but sharp striæ, which are sometimes perceptibly coarser on the back of the last whorl; apex globose, the first three whorls of about equal diameter, second whorl higher than the third. Whorls 10½ to 11½, the last compressed laterally. Aperture but little oblique, a trifle retracted above and below, pyriform or quadrangular-pyriform, the sinulus high and well defined; peristome rather widely reflexed, somewhat thickened, continuous, the upper margin shortly free and slightly or not emarginate. Superior lamella subvertical, compressed, continuous with the spiral lamella. Inferior lamella transversely converging to the other, strongly spiral within; not emerging upon the lip. Subcolumellar lamella emerging, nearly or quite attaining the margin. Principal plicæ rather long; palatal plicæ seven or fewer, the upper two curved, diverging forward from the principal, longer than the others except the lower one. Clausilium strongly curved, short, broader and thickened distally, emarginate posteriorly on the columellar margin (Pl. XXV, figs. 42, 43, 44).

Alt. 21, diam. 4.5, longest axis of aperture 4.6 mm.

Alt. 18, diam. 4, longest axis of aperture 4 mm.

Boshiu; Suruga coast (F. Stearns).

This species stands between *C. oostoma* and *C. brevior* in size, and has the slender apical whorls and therefore concave-sided spire of the latter, which differs in being more obese with a different-shaped aperture. It is probably nearest to *C. nikkoensis* Mlldff., but that species, from the description, must be even more slender and with the inferior lamella reaching the margin of the peristome, which is not at all the case in *C. hondana.* Were it not for this differential feature I would not distinguish my shells from Dr. von Moellendorff's species. The clausilium is much like that of *C. brevior.*

Of five specimens opened, no two quite agree in the palatal folds, and some are so different that one could scarcely believe them variations of one species were not all the other characters, including the clausilium, quite identical in the series. The following variations occurred:

(*a*) Palatal plicæ seven, as above described (figs. 13–15).

(*b*) Palatal plicæ three, two above, one below, the third, fourth, fifth and sixth wanting (fig. 18).

(*c*) Palatal plicæ four, the lower and two upper undiminished, the third small, a foldless space below it (fig. 17).

(*d*) Palatal plicæ three, a very low but distinct, straight lunella running from the second to the lower plica (fig. 16).

These variations seem enough to make several species of, but I feel confident that they belong to one species. Specimens *a* and *b* are from Boshiu, *c* and *d* from Suruga.

**Clausilia subjaponica** n. sp.

General appearance of *C. japonica* Crosse. Whorls 12 to 13½, the apex very obtuse, not tapering as in *japonica,* and the attenuated portion of the spire is thicker. Aperture with thickened, reflexed peristome, the superior lamella separated by a hiatus from the spiral lamella; subcolumellar lamella emerging, running to the margin. Principal plica short, extending but slightly or not at all inward beyond the upper palatal plica. Palatal plicæ four, the upper quite long, the lower bow-shaped or arched, the two ends bent downward; the two intermediate plicæ short. Clausilium narrower than in *C. japonica,* the palatal margin obliquely sloping toward the apex, which is thickened and obtusely rounded; columellar margin slightly excised or subemarginate near the filament, or merely tapering there.

Length 28, diam. 6 mm.

Length 28, diam. 5½ mm.

Length 23, diam. 5½ mm.

Ibuki, Omi (Mr. Y. Hirase).

The shell does not differ strongly from *C. japonica,* certain forms of which have the superior and spiral lamellæ disconnected, and sometimes there are four palatal plicæ; but the shape of the lower palatal plica or fold is different, it being short and oblique in *C. japonica,* not arched as in this species. The shape of the clausilium, however, is strikingly unlike in the two species, that of *C. japonica* (+ *nipponensis* + *kobensis*) being constantly broader, with pointed apical end, in specimens examined from some fourteen localities. This will be suitably illustrated in a future communication, as the space on my plates does not allow figuring at this time.

### Section HEMIPHÆDUSA Bttg.

### (*Group of C. validiuscula.*)

**Clausilia Nolani** n. sp. Pl. XXV, figs. 19, 20, 21.

Shell rimate, fusiform, attenuated above, solid, of a dark-brown color; distinctly but finely striate. Whorls 10, moderately convex, separated by impressed sutures, the outlines of the spire somewhat concave above; last whorl a little compressed. Aperture squarish-ovate, hardly oblique; sinulus short, retracted; peristome brownish, expanded, subreflexed and thickened, continuous and free above, and slightly or not emarginate there. Superior lamella somewhat oblique, *very widely separated from the spiral lamella,* attaining the margin. Inferior lamella scarcely emerging, but slightly visible from in front, bifurcate and straightened within. Subcolumellar lamella not emerging. Principal plica strong, visible within the aperture, where it even approaches the lip, extending inward but slightly beyond the palatal plicæ. Palatal plicæ two, parallel, rather long, diverging from the principal plica anteriorly, and nearly ventral in position. No lunella.

Alt. 15.5, diam. 3.5, longest axis of aperture 4 mm.

Fukura, Awaji Island (Mr. Y. Hirase).

This species has much the form and color of the otherwise very different *C. aurantiaca.* It differs from *C. caryostoma* Mlldff. in having no punctiform plica between the two palatals, and in having the superior lamella very widely separated from the spiral lamella; from *C. interlamellaris* v. Mart. in the wholly immersed subcolumellar lamella, disconnected superior and spiral lamellæ, and in having two, not four, palatal plicæ. *C. gracilispira* Mlldff., described from Kobe, differs in being smaller, with three palatal plicæ, and continuous superior and spiral lamellæ. *C. validiuscula* var. *bilamellata* Bttg., of Kiusiu, has three palatal plicæ and is a larger shell.

The wide hiatus between the superior lamella and the spiral lamella is characteristic of this species, which is named in honor of the editor of the *Proceedings* of the Academy of Natural Sciences of Philadelphia.

**Clausilia tosana** n. sp. Pl. XXV, figs. 22, 23, 24, 25, 41.

Shell small, slender, fusiform, solid, distinctly attenuated and with concave outlines above; light brown; finely, rather irregularly striate. Whorls 9 to 10½, the upper ones convex, last three less so, the last whorl compressed, tapering, *becoming free for a short distance* in front (like a "*Cylindrella*"). Aperture slightly oblique, pyriform, the sinulus a little retracted; peristome continuous, expanded, somewhat reflexed, thickened and white. Superior lamella small and rather low, oblique, attaining the margin, continuous with the spiral lamella, though there is a depression at their junction. Inferior lamella not emerging, hardly visible in a front view, but seen to be strong when viewed obliquely; inside it ascends almost vertically, and is stouter below. Subcolumellar lamella very deeply immersed. Inside the spiral and subcolumellar lamellæ terminate on the ventral side and are of about equal length, while the inferior lamella is slightly shorter. Principal plica strong, visible within the aperture, ascending to a lateral position. Palatal plicæ lateral, the upper rather long and curved down at its outer end, lower plica shorter but well developed, two small, short, contiguous plicæ (or sometimes one plica) midway between them. Clausilium rather long, with parallel sides and thin rounded apex; posterior end tapering (Pl. XXV, fig. 41).

Length 12.2, diam. 2.5 mm.

Length 10.5, diam. 2.5 mm.

Ushirohawa, Tosa, Shikoku Island (Mr. Y. Hirase). This little species differs notably from the allied *C. caryostoma* and *C. gracilispira* in the produced last whorl, the aperture standing out somewhat like that of a *Diaphora* or *Urocoptis,* though only shortly. The spire is more attenuated than in those species. It is very solid and strong for so small a *Clausilia.* The specimens vary a good deal in size. Types are No. 79,320 coll. Acad. Nat. Sciences, from No. 550 of Mr. Hirase's register.

(*Group of C. aurantiaca.*)

**Clausilia shikokuensis** n. sp. Pl. XXV. figs. 30, 31, 32.

Shell rimate, fusiform, somewhat inflated, attenuated and with concave outlines above; solid; of a rather bright orange-brown color; finely, rather obsoletely striated, the last whorl more strongly and sharply so. Whorls about 10½, moderately convex, separated by impressed sutures, the last whorl compressed laterally, shortly solute. Aperture ovate, somewhat oblique, the sinulus rather high and retracted; peristome orange-brown, reflexed and thickened, continuous, slightly emarginate above. Superior lamella somewhat oblique, rather strong, continuous with the spiral lamella. Inferior lamella scarcely emerging, inconspicuous in the front view, but becoming strong and thickened within; viewed obliquely from below it is seen to be distinctly bifurcate. Subcolumellar lamella not emerging, invisible from in front, but seen in an oblique view. Principal plica visible within the mouth, extending inward a little beyond the lunella. Lunella lateral, well curved, especially above, where it is continued backward in and quite united with the anterior end of a short upper palatal fold, being thus somewhat irregularly bow-shaped. Clausilium narrow, tongue-like.

Alt. 16, diam. 3.8, longest axis of aperture 3.5 mm.

Ushirohawa, prov. Tosa, Shikoku Island (Mr. Y. Hirase).

This species seems most nearly allied to *C. ignobilis* Sykes and *C. subaurantiaca* Pils. The former species, also from Shikoku Island, differs in the emerging inferior and subcolumellar lamellæ; is rather less attenuated above, judging by the figure, but is of about the same size.[1] *C. subaurantiaca* is a more slender, smoother species, in which the straighter lunella is united with the middle of the upper palatal plica. In *C. aurantiaca* Bttg. the lunella is I-shaped, and ventral in position, quite unlike the bow-like and lateral lunella of *C. shikokuensis.*

## EXPLANATION OF PLATES.

(Figs. 2, 5, 8, 10, 14, 20, 23, 24, 31 are natural size; the others enlarged.)

### PLATE XXIV.

Figs. 1, 2, 3. *Clausilia* (*Euphædusa*) *comes* n. sp.
Figs. 4, 5, 6. *Clausilia* (*Euphædusa*) *monelasmus* n. sp.
Figs. 7, 8, 9. *Clausilia* (section ?) *iotaptyx* n. sp.
Figs. 10, 11, 12. *Clausilia* (*Tyrannophædusa*) *Mikado* n. sp.
Figs. 13, 14, 15. *Clausilia* (*Stereophædusa*) *hondana* n. sp., type.
Figs. 16, 17. *Clausilia* (*Stereophædusa*) *hondana* varieties, prov. Suruga.
Fig. 18. *Clausilia* (*Stereophædusa*) *hondana* variety, Boshiu.

### PLATE XXV.

Figs. 19, 20, 21. *Clausilia* (*Hemiphædusa*) *Nolani* n. sp.
Figs. 22, 23, 24, 25. *Clausilia* (*Hemiphædusa*) *tosana* n. sp.
Figs. 26, 28. *Clausilia monelasmus.* Inner view of clausilium.
Fig. 27. *Clausilia monelasmus.* Columellar view of clausilium.
Fig. 29. *Clausilia monelasmus.* Outer and basal view of clausilium.
Figs. 30, 31, 32. *Clausilia* (*Hemiphædusa*) *shikokuensis* n. sp.
Figs. 33, 34. *Clausilia* (*Zaptyx*) *Hirasei* Pils. Clausilium in profile from palatal side, and view of inside.

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[1] In the figure of *C. ignobilis*, Proc. Malac. Soc. Lond., I, p. 262, fig. 5, the lunella is represented as connected with the *plica principalis.* Such a structure would be unique in Japanese *Hemiphædusæ,* but I think it is probably an error of the artist, and no such connection really exists.

Figs. 35. 36. *Clausilia* (*Euphædusa*) *comes*. Inner views of the clausilium.

Fig. 37. *Clausilia* (*Tyrannophædusa*) *Mikado*. Inner view of the clausilium.

Fig. 38. *Clausilia* (*Tyrannophædusa*) *Mikado*. Clausilium from columellar side.

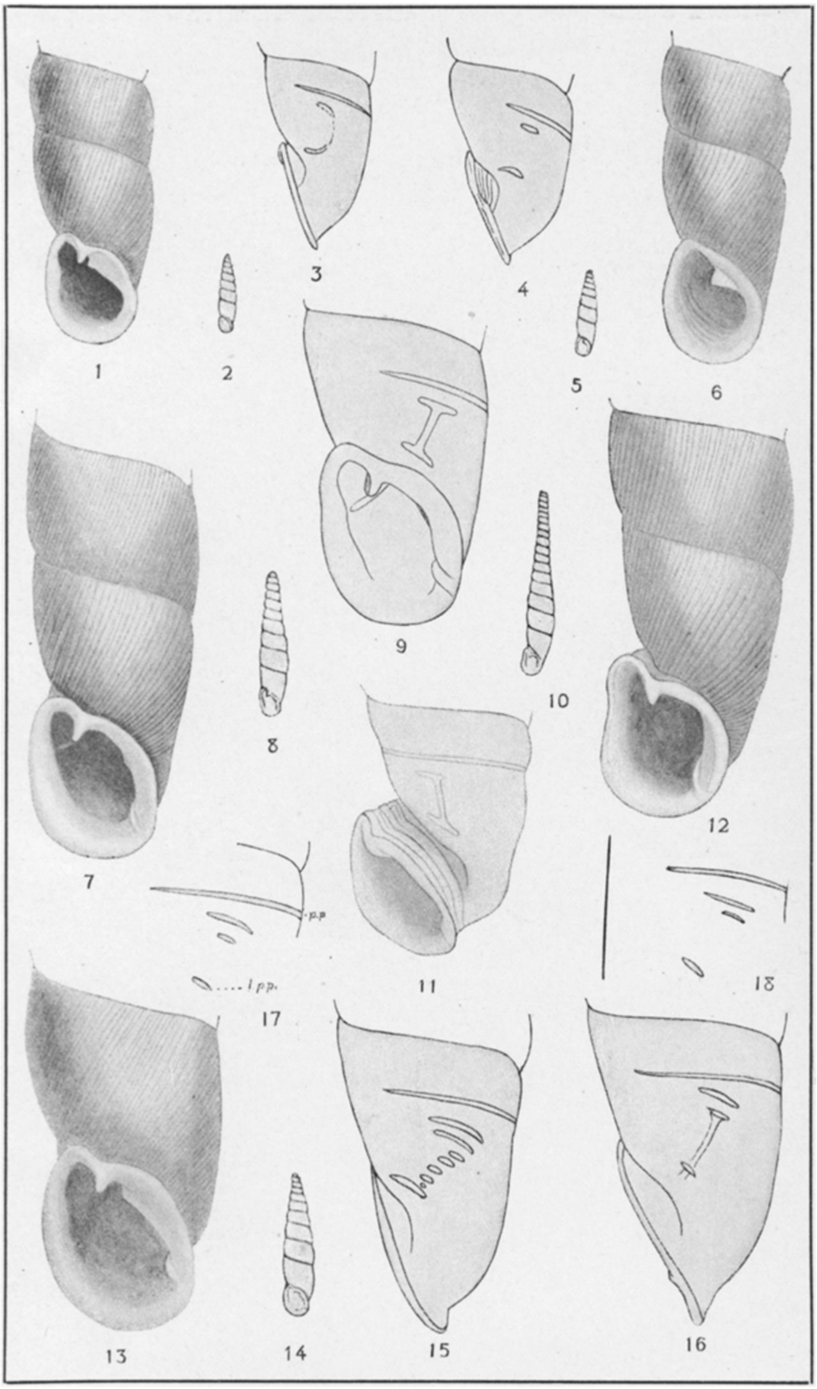
Fig. 39. *Clausilia* (*Tyrannophædusa*) *Mikado*. Clausilium from outside.

Fig. 40. *Clausilia* (section ?) *iotaptyx*. Clausilium from inside.

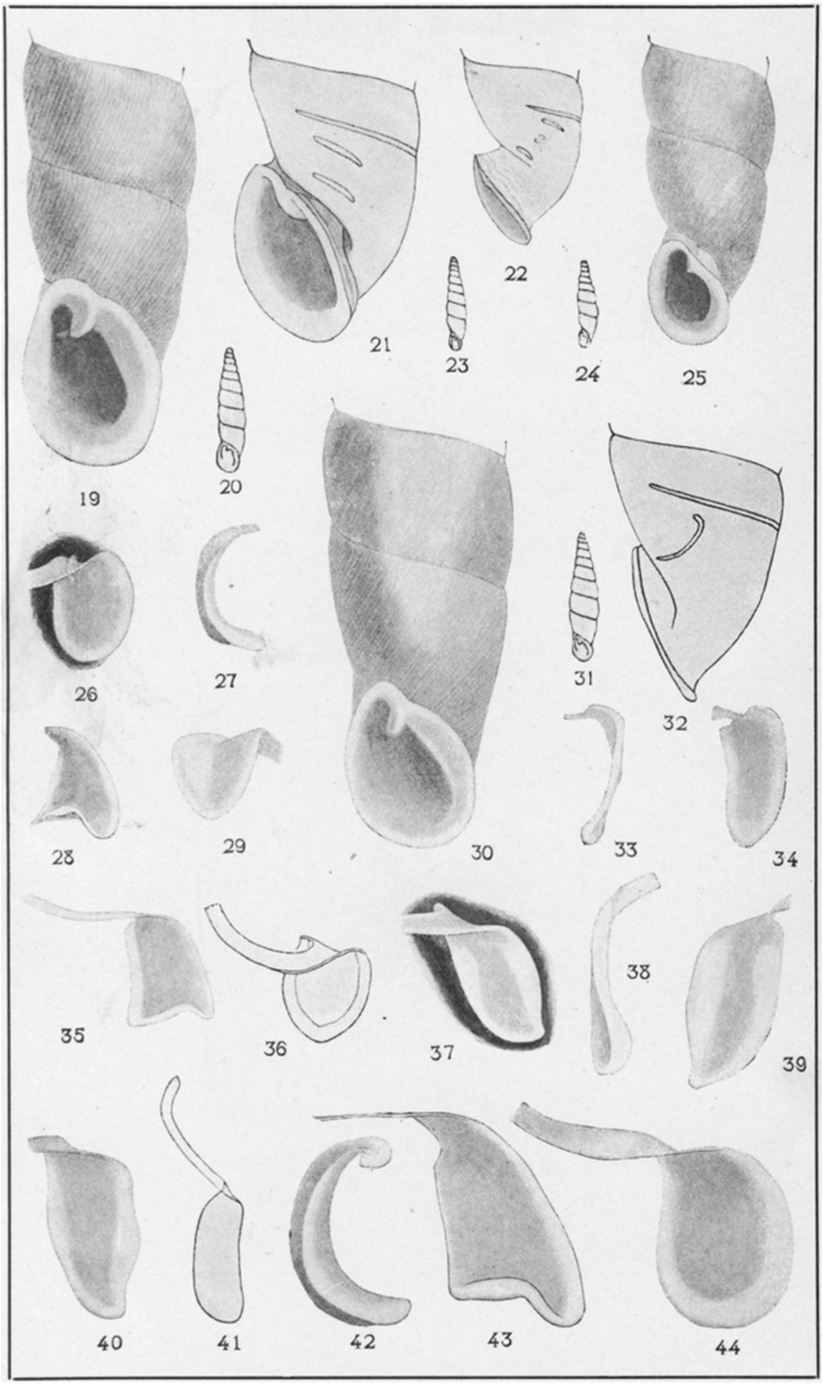
Fig. 41. *Clausilia* (*Hemiphædusa*) *tosana*. Clausilium from inside.

Fig. 42. *Clausilia* (*Stereophædusa*) *hondana*. Clausilium from columellar side.

Figs. 43, 44. *Clausilia* (*Stereophædusa*) *hondana*. Clausilium from inside.



PILSBRY. JAPANESE LAND SNAIL FAUNA.



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